X-band Structure Production History

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AAC Meeting

November 19th, 2003

Outline

- RF Structure Factory Infrastructure
- FXA type RF Structures
- FXB type RF Structures

Infrastructure (will be seen on Tour)

Structure Assembly
Clean Room

(Class 1000)

Proper Clean Room Attire

Infrastructure

RF Quality Control
Clean Room

(Class 3000)

A Structure during Bead-Pull Measurements & Tuning

Infrastructure

Small Vacuum Furnace:

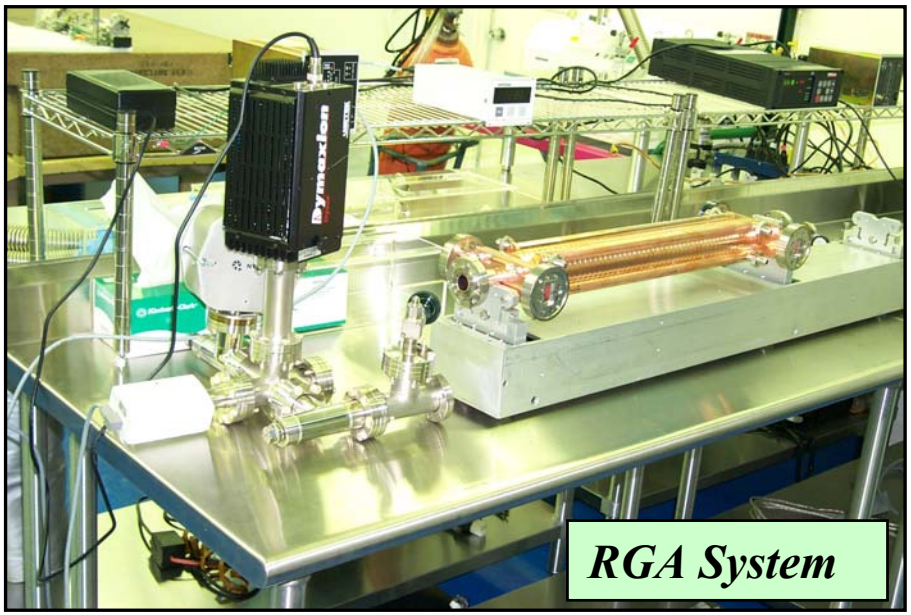
- Installed in FY01
- All molybdenum hot zone
- 12 inch x 12 inch x 15 inch
- Dry Roughing Pump & CRYO Pump
- 1200 degree C max temperature

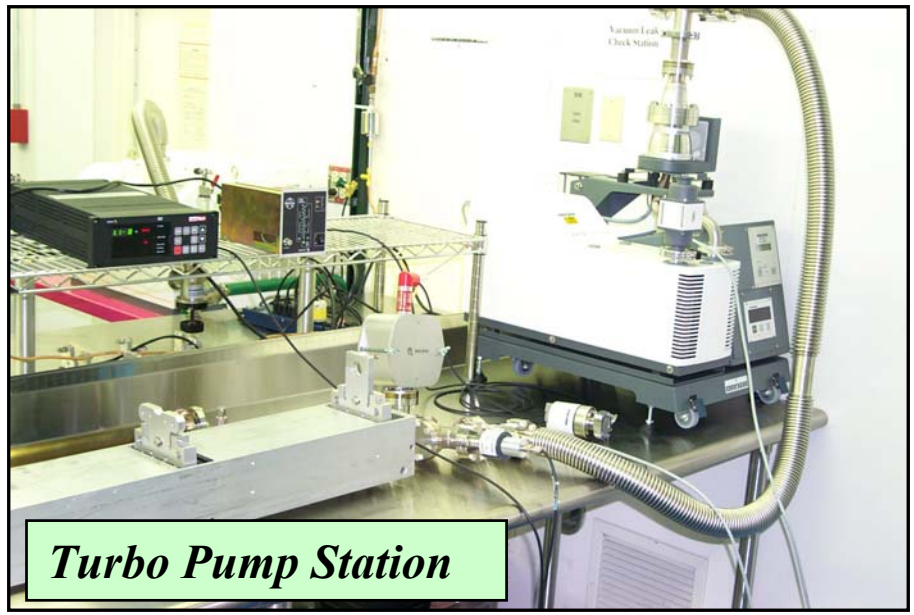
Large Vacuum Furnace:

- Installed in FY02
- All molybdenum hot zone (Recently purchased from Schwarzkopf Technologies)
- 20 inch x 100 inch
- Dry Roughing Pump & CRYO Pump
- 1200 degree C max temperature


New Chiller


DI Water System


RGA System

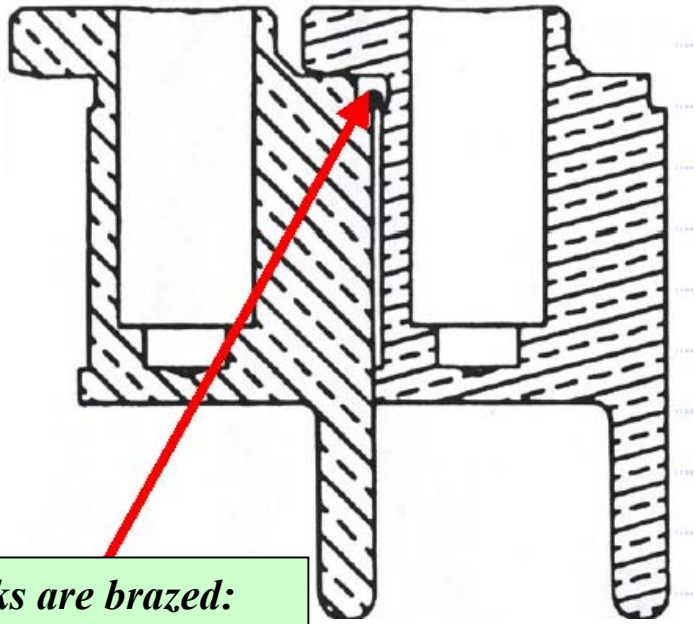

Turbo Pump Station

FXA type RF Structures

- We have produced three 20-cm long (short length) traveling wave, detuned, constant gradient structures: FXA-001, FXA-002 and FXA-003:
  - These structures were not high power tested. They were produced to evaluate the feasibility of the Factory Infrastructure and to learn & gain experience in RF structure fabrication
- Design is identical to SLAC T20VG5 structure (except brazing grooves in the disks)
- All brazed structures, no diffusion bonding
- Disks are precision machined, no diamond turning [industrial vendors]
- Couplers are precision machined with some diamond turned RF surfaces (iris area) [industrial vendors]

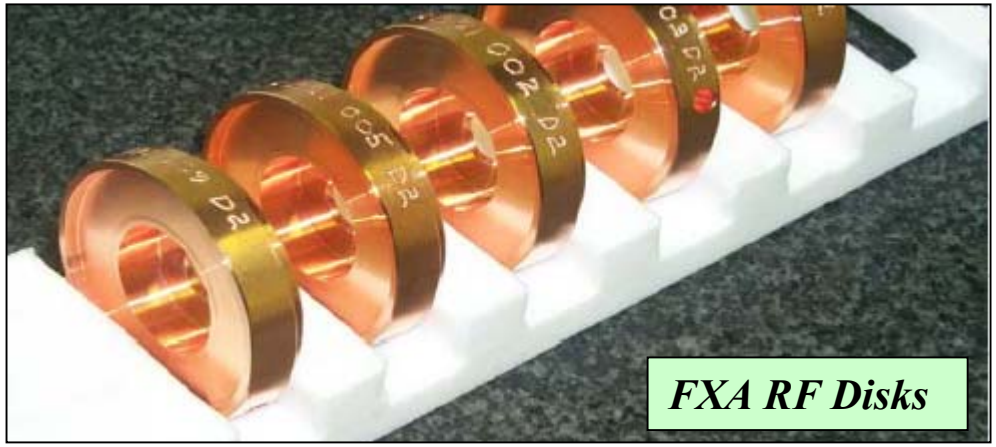
FXA type RF Structures

- FXA-001 was brazed at an outside furnace company
- FXA-002 couplers were brazed in Fermilab Small vacuum furnace and the rest of the brazing was completed at an outside furnace company
- FXA-003 was totally brazed and fabricated at Fermilab vacuum furnaces



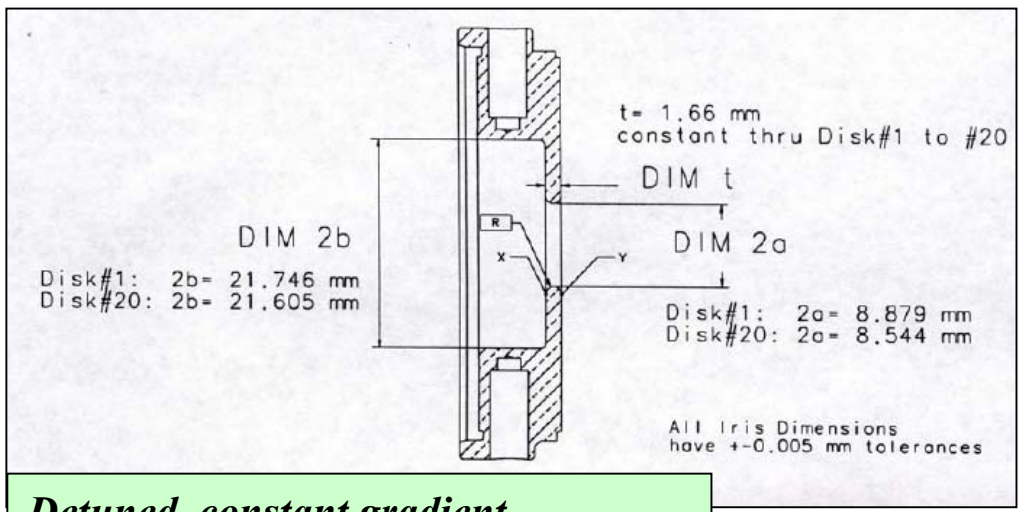
Disks are brazed:

0.89 mm diam. brazing wire

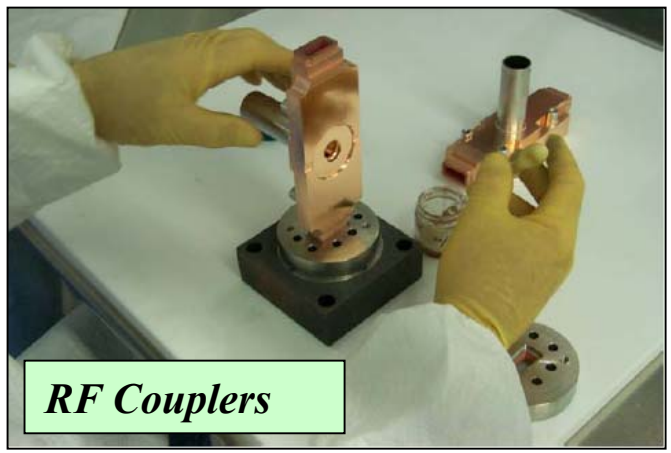


FXA RF Disks

FXA-003 in the large vacuum furnace



Detuned, constant gradient



RF Couplers

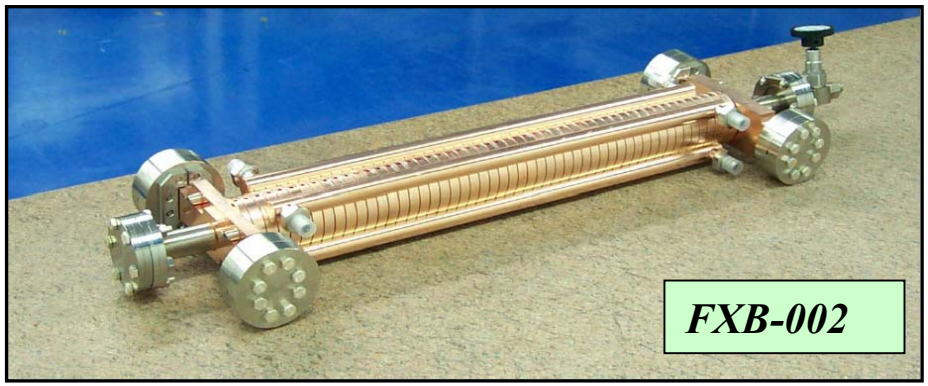
FXB type RF Structures

- We have produced six 60-cm long (full length) traveling wave, detuned, constant gradient structures: FXB-002 thru FXB-007
  - Except FXB-005, all the FXB structures were high power tested at NLCTA, SLAC
- We have produced 9 full length dummy (no iris) structures for Girder Studies
- Design is identical to SLAC H60VG3 structure (except brazing grooves in the disks)
- All brazed structures, no diffusion bonding
- Disks & Couplers are precision machined, no diamond turning (industrial vendors)

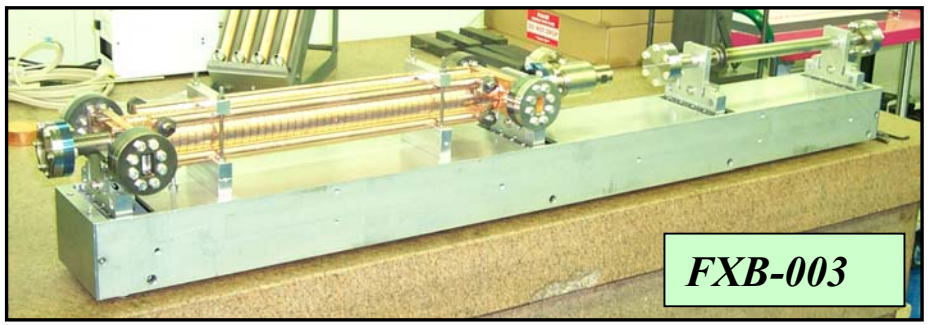
From FXA to FXB structures:

- Disk OD is increased from 45 mm to 61mm
- Structure length is increased from 20 cm to 60 cm
- Disk & Coupler Etching with SLAC C01 procedure
- Strict Clean Room Working Procedures
- Traveler Development (it is currently fully implemented & controlled)
- Improvements from Structure to Structure
  - Fermilab Coupler Design (Fat lipped couplers, Wave guide couplers)
  - Fabrication Procedure

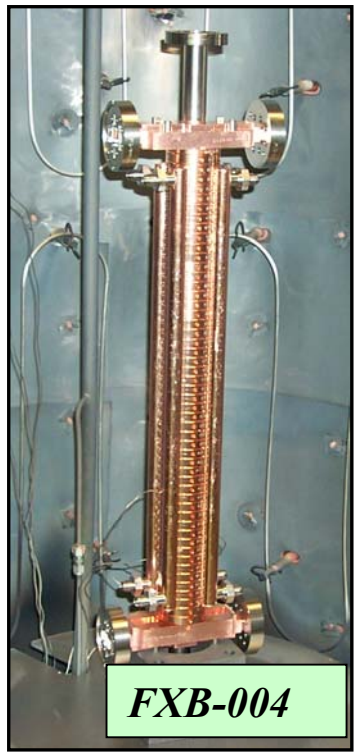
FXB-002 and some of us from Fermilab
RF Structures Group @ NLCTA



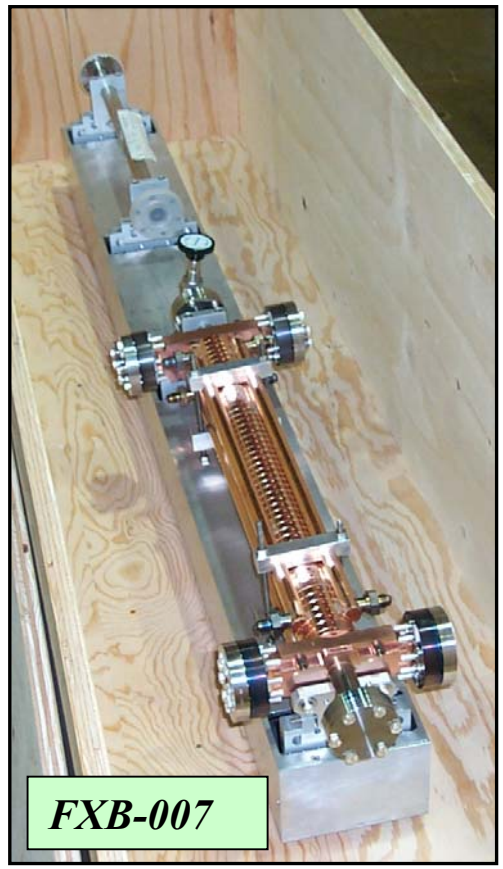
FXB-002



FXB-003



FXB-004



FXB-007

High Power Test Results

From C. Adolphsen, SLAC